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Students with low language aptitude have been found to have poor powers of auditory discrimination. To date, programed language instruction has relied on audio confirmation of oral response. A study was conducted to determine the value of adding visual confirmation to the audio model. A total of 170 experimental and 140 control students in second semester college French were tested for language aptitude. The control students used a programed course in the language laboratory which provided audio confirmation only. The experimental students used a form of the course which made the correct response to stimuli available in invisible ink. In this process, called ACCESS, the written response appears after the student gives his oral answer and marks in the proper space with an impregnated pen. Students were tested for listening comprehension, writing, and reading, but only the writing test was used as a basis for comparison. The results obtained by the entire experimental class were significantly superior to those in the control group, while the dropout rate was less than half that for the control section. As predicted, low-aptitude students, those below the 40th percentile, particularly profited from simultaneously hearing and seeing the confirmation answer. (JY)

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Immediate Audio and Visual Confirmation "Breakthrough" for the Low-Aptitude Language Student

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Learning a second language is an exceedingly difficult task for the student who has little linguistic inclination. Contrary to what has been often stated that a second language can be learned by anyone who has learned his native tongue, it is now becoming more and more evident that some students can acquire competence in a foreign language only after an excessive amount of time if then. This problem has become acute in the nineteen sixties when an ever greater number of students are enrolled in college and have to take a FL to satisfy the college requirements. The increase in number of students meant particularly that many less gifted students are now in college who before would have chosen a trade.

Many concerted efforts have been made since World War Two to help the student in his task, culminating recently in Programmed Language Instruction. The student with low language aptitude has been the object of research in a number of studies.(1) He is again the subject of this report.

The Problem.

Programmed Language Instruction relies on immediate reward for every correct response as one of the essential conditions for shaping new behavior. It assumed that the knowledge of having given a correct response, of being right, is a powerful reinforcer. Therefore a confirmation answer is given in the language laboratory after each pause.

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The student is supposed to compare his response with that given as the model and from it deduce whether his answer was correct or not. The method of providing the student with a model answer on tape was investigated in recent years: should the student record his response and later listen to it and the model, or is simultaneous hearing the response when making it (audio-active earphones) sufficient? The research into this problem remained inconclusive.(2) In all cases the student had to compare an oral response with an audio model.

The central question though was seldom raised: Can the student make such comparisons? Particularly, can the low-aptitude student effectively compare his response with the model and thus receive reinforcement for his learning? There is no way to ascertain what goes on in the student's brain, sometimes referred to as the black box. We don't know whether he attempts to compare, and if he does, how accurate or inaccurate his comparisons are. Therefore, are his responses reinforced? Or are all responses, the correct ones and the incorrect ones judged to be right and thus reinforced? This question is crucial in habit formation. Without effective reinforcement, the best program cannot achieve its objective. An essential trait of operant conditioning is missing.

There is evidence that the student, and particularly the low-aptitude student, cannot compare his oral performance with an auditory model. The student does not necessarily hear what is said on tape, but what was said is being interpreted through what he expected to hear, and through the acoustic filter in his ears. This fact is clearly shown in discrimination exercises where the student must listen to a number of correct and incorrect utterances and judge each

as to its correctness. The low-aptitude student makes many mistakes in such an exercise and thereby demonstrates his weakness in identifying what he hears. Anyone who has worked in remedial phonetics knows how difficult it is to make the student hear the correct model and to make him compare his own utterance with the model given by the instructor.

Pimsleur (1966) identified "auditory ability" as one of the principal factors that differentiated the successful student from the under-achiever. He defines "auditory ability" as "the ability to receive and process information through the ear." He found that such auditory ability included two components: "sound discrimination and sound-symbol association." It is the "ability to remember the sounds and their significance" and the "ability to associate sounds with their written forms accurately and rapidly." He concludes that "auditory ability influences a student's success in foreign language learning."(3) In the same study Dr. Benjamin Kovik, after exhaustive personal interviews with adult students who had difficulty learning a foreign language, noted that "all students emphasized the difficulty of taking dictations and grasping a continuous stream of heard language."(4)

Carroll (1965) points out that according to educational research "materials being presented visually are more easily learned than comparable materials presented aurally."..."An adequate theory of language learning should take account of how the student handles visual counterparts of the auditory elements he is learning."..."The more kinds of association that are made to an item, the better is learning and retention. Again this principle seems to dictate against systems

of language teaching that employ mainly one sensory modality, namely hearing."(5)

This study suggests the hypothesis that the student in general, and the low-aptitude student in particular, can make a more accurate comparison between his oral production and a model when it is given both orally and in writing, provided that the written model is not available to him before he makes his response. If such is the case, then the confirmation becomes a potent reinforcing agent, and new language behavior can be shaped effectively.

Procedures:

A Second Semester class of 170 students (Spring Semester, 1968) is being compared with a Second Semester class taught in the Fall, 1967. The experimental students consisted of two subgroups: those registered in French 105 and those registered in French 106. French 105 is a continuation of the First semester. Its students did not have French in high school. French 106 is a Second Semester course for students with two or three years of high school French who did not pass the placement test for the Third Semester Course. 128 students were enrolled in 105 and 42 students in 106.

The control students consisted of a Second Semester class of 141 students who took the course in the Fall of 1967. At that time a 106 course for students with high school French had not yet been established.

The students' aptitude was measured by MLAT.(6) For those in 105 the test was administered in their First Semester, and for those in 106 the test was administered at the beginning of the course.

Chart 1 : Student aptitude measured by MLAT

Control Students	Experimental Students	
	105	106
average : 53%ile	61%ile	48%ile

The above chart suggests that the two groups of students were not significantly different in ability.

Basic French - A Programmed Course, by Mueller and Niedzielski (Appleton-Century-Crofts) was used with all classes. It is a self-instructional course with respect to the grammatical explanations and the drill materials in the language laboratory. The work in class builds on what has been learned outside of class. Classes, also called display sessions, because the student demonstrates what he has learned to do in the language, are "taught" by Graduate Assistants of the Department, who have had no teaching experience. The work done in class, therefore, does not affect the basic learning process. This kind of class work has been used for several semesters and has remained essentially unchanged, except for the skills the instructors brought to it.

The learning process in the language laboratory is the essential difference between the two groups of students. The control students, that is, the students prior to the Spring Semester, 1968, used a "Test Edition" of the Program which contained in print one third of the stimuli he heard and of the responses he was expected to make. The student, therefore, did not need to make an effort to hear stimulus and response for a portion of the work, and had to rely on hearing for the major part of his learning. The experimental students, those who took

French in the Spring of 1968, used the final revision of the Program which was published in January, 1968. Its distinctive feature consists in having correct responses to stimuli available in invisible ink and these appear only after the student has given his answer to the stimuli. The invisible ink responses are made visible when the student marks the proper space with an impregnated pen. This procedure, called ACCESS, is similar to the operant conditioning paradigm.

The effectiveness of reinforcement depends upon the simultaneous presentation of the correct written response and the correct spoken response. The ACCESS procedure allows the student to make his written response; this is immediately followed by the correct visible response which is paired with the correct auditory one.

This process permits using proven features of learning:

Vanishing: After several models have been given, the grammatical features to be taught are vanished, that is, they are printed in invisible ink and appear after rubbing an impregnated pen over the proper space. As the exercise progresses the entire response and later the stimuli are vanished in this fashion.

Immediate audio and visual confirmation: The effectiveness of confirmation depends on being given immediately after the student has made his response and on its being heard and seen simultaneously. The ACCESS process permits to hide the response until the student has made his and then to reveal visually the correct utterance or sentence while simultaneously the confirmation model is given aurally.

The Results:

The results for both the control and the experimental students were measured by the MLA Cooperative Test,[7] using the Listening Comprehension, the Reading and the Writing Tests. Due to the large number of students

and the very inadequate laboratory facilities at this institution, the speaking test could not be administered.

Whether the ACCESS process would affect the student's ability to understand spoken and written French is debateable. The primary concern of this study is the student's language performance, that is, his ability to speak and to write French. The MLA Writing test is therefore used as the basis of comparison.

Chart 2: Mean Scores on MLA Writing Test

Control Students		Experimental Students			
		Sections 105		Sections 106	
Points	Percentile Ranking	Points	Percentile Ranking	Points	Percentile Ranking
45.6	43%ile	58.5	67%ile	57.7	63%ile

Chart 3: Distribution of MLA Writing Scores

Percentile Ranking MLA Test	Control Students % of students	Experimental Students Sections 105 % of students	Experimental Students Sections 106 % of students
80-99	17.9 %	37.3%	40.4%
60-79	10.4%	21.4%	21.4%
40-59	28.0%	18.2%	16.6%
25-39	17.9%	15.6%	9.5%
1-24	25.0%	7.1%	11.9%

The difference between the two subgroups among the experimental students is insignificant, those having had French in high school being slightly inferior to those who did not have any, and explainable by the fact that with prior experience in high school they did not put forth the same amount of effort as the others.

A comparison of the experimental groups (mean 67%ile) with the control group (mean 43%ile) shows a significant difference in mean scores. The distribution of the results is also interesting. Almost 70 percent of the

experimental group scored above the 50th percentile mark on the test while only 42 percent of the control group achieved similar results.

Mean Score and Range for 30

Chart 4: Low-Aptitude Students
(40th Percentile and below)

Mean	% ile Rank
between 55 and 53 points	58th% ile
Range	
29 to 79	18-93% ile

Chart 5: Distribution of Percentile Scores

	Low-Aptitude students		Average or Above average students	
Percentile on MLA Test	Number of students	Per cent	Number of students	Per cent
80-99	6	20.0%	40	41.6%
60-79	8	26.6%	21	21.8%
40-59	8	26.6%	15	15.6%
25-39	5	16.6%	13	13.5%
1-24	3	10.0%	7	7.3%

The results (average of 53 percentile) obtained by the low-aptitude students are, of course, lower than those obtained by their more able colleagues. These results, however, are significantly superior to those obtained by the control students (43% ile) and compare favorably with those obtained on a national average. Almost three fourth of the low-aptitude students achieved acceptable to good results on this test, that is scored at the 40th percentile level or better.

Chart 6: Number and Frequency of Low Scores
(between 1-39th% ile)

	Number of students	Percentage
average and above average students (45th to 99th% ile)	23	24.7%
low-aptitude students (1st to 40th% ile)	8	26.6%

In comparing the distribution of the low scores, that is, of scores below the 40th percentile level, one fourth of those students considered to be of average or above average aptitude are represented, while almost the same percentage of low aptitude students obtained such results. It can, therefore, be asserted that aptitude measurement is no longer a valid predictor of success in this course. Almost every student has an equal chance in spite of his aptitude, provided he is willing to put forth the effort.

The results obtained in this study could have been influenced by the number of students who withdrew from the class before the end of the semester. If a large number of poor students left, the end-of-course test average for the experimental classes could be artificially inflated. Table 7 shows that among two groups of control students the number of students withdrawing during the semester is significantly larger (.01 level) than those leaving the experimental groups. It might be expected that the withdrawal rate for the low-aptitude students would be larger than for the total experimental group and it is; it is important to note that it is less than the withdrawal rate for the control group.

Chart 7: Drop-outs

Control Students		Experimental Students	
		total	low-aptitudes
Spring 1967	12.3%	5.0%	9.0%
Fall 1967	12.0%		

A second group of 241 students in Spring 1967 are listed in the above chart to show that a 12% drop-out rate is consistent and does not vary significantly from semester to semester.

The drop-out rate of 5% for the experimental students is less than half the rate in the control groups (12%). This fact is significant at the 0.01 per cent level. The drop-out rate of low-aptitude students is expected to be higher than the rate for the entire class. Yet it is significant to note that in this case it is lower (9%) than that of the control students.

Could the low drop-out rate in the Second Semester course under study be attributed to a high drop-out rate in the First Semester or to discontinuance of Foreign Language study on the part of low-aptitude students? Only 15% dropped French during their First Semester in the Fall 1967, that is the semester preceding the one under study. In the Experimental class the ratio of low-aptitude students was 26 per cent as compared to 35 per cent for the First Semester Class in the Fall of 1967. Certainly, a number of low-aptitude students decided not to continue. Yet, such an attrition as represented here is normal anywhere. It can be said, that a majority of them felt able to continue into the Second Semester. Furthermore, the aptitude average as measured by MLAT for both the Control and the experimental students did not vary significantly.

Pimsleur's study (1964) suggests that the under-achievers' low auditory ability is responsible for many students abandoning the study of a foreign language.(8) Mueller and Leutenegger (1964) in their study of drop-outs at

the University of Florida mention that "emphasis on audio-lingual learning is a frustrating experience for the student....The significant discrepancies in four of the Seashore Measures between the groups of students who dropped out and those who finished the course seem to lend further weight to the theory that these students had too much trouble with learning through the ear exclusively."(9)

Both the results and the reduced drop-out rate in the experimental class support the suggestion that immediate audio and visual confirmation is an essential factor in second language learning. It reinforces learning by confirming the correct responses and correcting the incorrect responses. It makes it possible for the student to compare his response with the one he was expected to give to the degree that the student is conscientious in his work. For the first time his comparison with the model is effective.

Whether the student's ability is being improved or not is still debateable and in need of further investigation. If such an ability can be improved, and it would seem rather discouraging if it were not, at least among young adults, this technique is most likely to accomplish it.

Whether some of the results among the experimental students can be attributed to motivation cannot be ascertained. However, whether immediate visual and aural confirmation does improve the student's desire to learn, or imparts to him the feeling of success and thus gives him greater motivation, is immaterial, as long as superior results are achieved. Whether the novelty effect (Hawthorne effect) of the ACCESS process is responsible for some of the results will have to be seen in subsequent semesters. It is rather doubtful that the Hawthorne effect should last for a full semester.

Conclusion.

A comparison of the results of the MLA Writing test at the end of the Second Semester course confirms the hypothesis that immediate audio and visual

confirmation is a key factor in second language learning. If the student has ready access to the written response without first making an effort the exercises are ineffective. Like rise exercises which give the student only an audio confirmation are ineffective because many students are unable to make a comparison between the response they have made and the model that is given on tape. The results which were obtained by the entire class were significantly superior to those in the control group while the drop-out rate was less than half of those in the control section.

This study is particularly concerned with the low-aptitude students, that is those below the 40th percentile. The evidence demonstrates that they in particular profit from hearing and seeing simultaneously the confirmation answer. The ACCESS process makes the confirmation answer an effective reinforcer in the shaping of new language behavior.

Language aptitude is no longer a valid predictor of success, because of the technique of giving audio and visual confirmation immediately after the student's response. Every student has an equal chance if he is motivated enough to put forth the effort.

Language learning in this study has been concerned only with the elementary language forms and basic structures, and not with the ability of generating novel sentences with correct grammar. In the early stages of language learning the student must first master the morphemic structures. Operant conditioning procedures have been found effective. This study does not concern itself with the arguments among structural linguists and those who prefer the theories of the generative grammarians.

1. See: Paul Pimsleur, Donald M. Sundland, Ruth D. McIntyre, "Under-Achievement in Foreign Language Learning," International Review of Applied Linguistics, Vol. II, No. 2, July 1966, pp. 113 ff.
   Theodore H. Mueller and Ralph Leutenegger, "Some Inferences about an Intensified Oral Approach to the Teaching of French Based on a Study of Course Drop-outs", The Modern Language Journal, Vol. XLVIII, No. 2, February 1964, pp. 91 ff.
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   Theodore H. Mueller, "Programmed Language Instruction -- Help for the Linguistically 'Underprivileged'", The Modern Language Journal, Vol. LII, No. 2, February 1968, pp. 79 ff.
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3. Paul Pimsleur et al., op. cit. pp. 135-136.
4. Ibid., p. 149.
5. John B. Carroll, "The Contributions of Psychological Theory and Educational Research to the Teaching of Foreign Languages," The Modern Language Journal, Vol. XLIX, No. 5, May 1965, p. 280.
6. John B. Carroll and Stanley Sapon, Modern Language Aptitude Test, The Psychological Corporation, New York, N. Y.
7. The Modern Language Association, Cooperative Foreign Language Tests, Form LA, Educational Testing Service, Princeton, N. J.
8. Paul Pimsleur et al., op. cit. p. 134.
9. Theodore Mueller and Ralph Leutenegger, op. cit. pp. 93-94.